



**Department of ENVIRONMENTAL QUALITY  
Division of Operations  
Office of Solid Waste Permits**

MEMORANDUM

**To:** Solid Waste Permit Staff

**FROM:** Hassan Vakili

**DATE:** May 18, 1993

**SUBJ:** Clarification of Required Final Cover Designs and Acceptable Alternate Designs

The purpose of this memo is to clarify the requirements for final covers under the VSWMR and delineate acceptable alternate designs that the Department may approve under 335.1.E.2., 5.2.E.1.b.(3), and 5.3.E.1.c. This is detailed in the attached table.

It should be noted that in accordance with the June 26, 1992 clarification published in the Federal Register, that the permeability requirement does apply to the eighteen inch infiltration layer. In addition, for those facilities whose design does not incorporate a composite liner at the bottom, the 18 inch infiltration layer may be replaced by an FML, however proper bedding must be provided as well as a two foot erosion layer as required by 335.1.E.12.b., 5.2.E.1.b.(3)(a), or 5.3.E.1.c.(2). For facilities with a composite liner at the bottom, alternate final cover designs will be evaluated on a case-by-case basis.

If you should have any questions regarding this matter, please see me.

Attachment

### Required Final Cover Designs and Acceptable Alternate Designs

Bottom Liner Design	Required Final Cover	Acceptable Alternate Design
Composite liner (FML/soil liner)	Minimum infiltration layer of 18 inches of $1 \times 10^{-5}$ cm/sec earthen material overlain by synthetic liner; minimum of 20 mils; if HDPE 60 mils, overlain by a minimum 2 foot erosion layer	Alternate designs (for example, designs incorporating composites such as Claymax7 or Gundseal7) will be evaluated on a case-by-case basis.
FML only (as for industrial and CDD landfills)	Minimum infiltration layer of 18 inches of $1 \times 10^{-5}$ cm/sec earthen material overlain by synthetic liner; minimum of 20 mils; if HDPE 60 mils, overlain by a minimum 2 foot erosion layer	Synthetic liner; minimum 30 mils; if HDPE 60 mils, with 12 inches of bedding material below that is no coarser than USCS sand (SP) and which is free of rock, fractured stone, debris, cobbles, rubbish, roots and sudden changes in slope, overlain by a minimum 2 foot erosion layer
Recompacted soil liner	Minimum infiltration layer of 18 inches of earthen material having permeability of $1 \times 10^{-5}$ cm/sec or permeability equal to bottom liner, whichever is less, overlain by an erosion layer that is at a minimum 6 inches or of sufficient thickness to sustain plant species, accommodate the root system, and prevent freeze/thaw conditions from damaging the low hydraulic conductivity layer, whichever is greater	Synthetic liner; minimum 30 mils; if HDPE 60 mils, with 12 inches of bedding material below that is no coarser than USCS sand (SP) and which is free of rock, fractured stone, debris, cobbles, rubbish, roots and sudden changes in slope, overlain by a minimum 2 foot erosion layer
No liner (in-situ soils)	Minimum infiltration layer of 18 inches of $1 \times 10^{-5}$ cm/sec earthen material overlain by an erosion layer that is at a minimum 6 inches or of sufficient thickness to sustain plant species, accommodate the root system, and prevent freeze/thaw conditions from damaging the low hydraulic conductivity layer, whichever is greater	Synthetic liner; minimum 30 mils; if HDPE 60 mils, with 12 inches of bedding material below that is no coarser than USCS sand (SP) and which is free of rock, fractured stone, debris, cobbles, rubbish, roots and sudden changes in slope, overlain by a minimum 2 foot erosion layer